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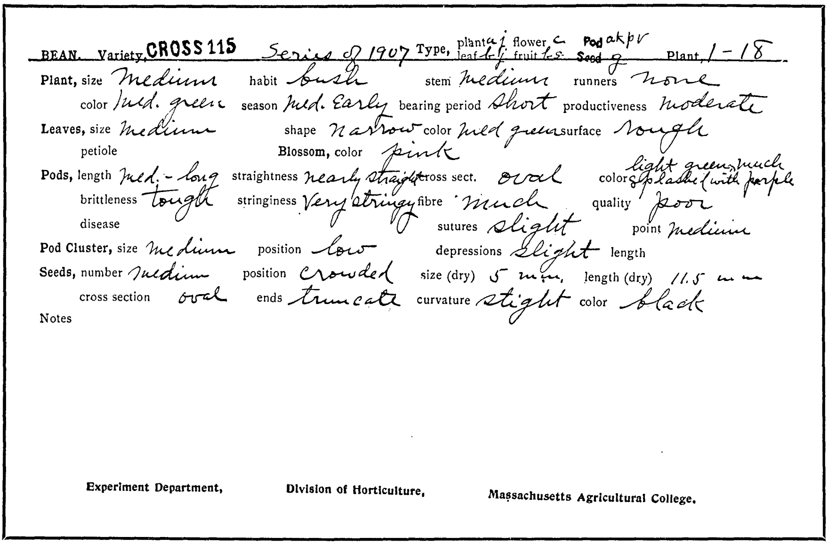
SHORTER ARTICLES AND DISCUSSION

A SYSTEM OF RECORDING MENDELIAN OBSERVATIONS

IN any experimental investigation the importance of making full, definite and at the same time simple and easily understood notes can hardly be overestimated. To record all pertinent observations in a convenient and easily accessible manner with the least expenditure of time and energy should be the object of the observer.

In connection with some investigations in plant breeding at the Massachusetts Experiment Station a system of records has been devised for use in experiments where segregation of characters occurs that has worked very well in practise and may be found suggestive to other observers who are investigating Mendelism and handling a considerable number of plants.

The records are kept on 5 × 8 index cards, though 4 × 6 cards might be preferred by some. All observations pertaining



BEAN. Variety, **CROSS 115** Series of 1907 Type, plant aj flower c **Pod** akpv leaf bj fruit bs **Seed** g Plant, 1-18

Plant, size medium habit bush stem medium runners none

color med. green season med. Early bearing period Short productiveness moderate

Leaves, size medium shape narrow color med green surface rough

petiole **Blossom,** color pink

Pods, length med.-long straightness nearly straight cross sect. oval color light green, much splashed (with purple

brittleness tough stringiness very stringy fibre much quality poor

disease sutures slight point medium

Pod Cluster, size medium position low depressions Slight length

Seeds, number medium position crowded size (dry) 5 mm. length (dry) 11.5 mm

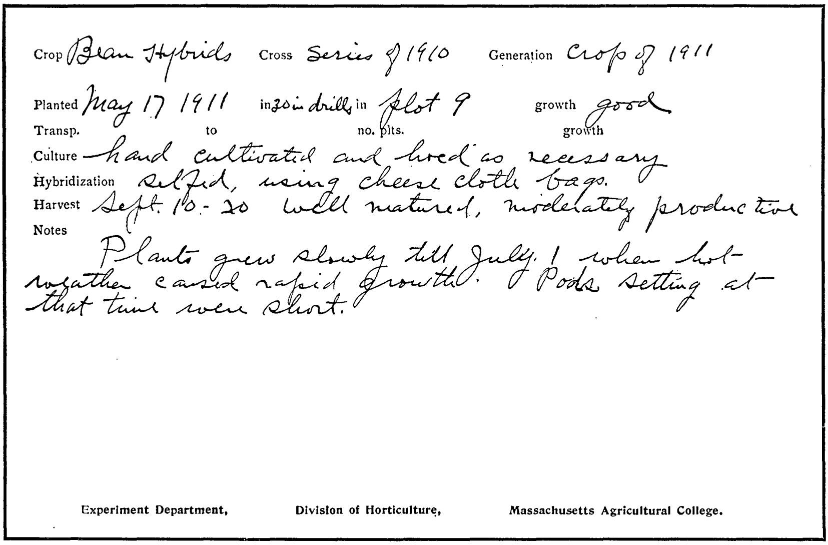
cross section oval ends truncate curvature slight color black

Notes

Experiment Department, **Division of Horticulture,** **Massachusetts Agricultural College.**

FIG. 1. Description Card.

to parent varieties or the F_1 generation are kept on blue cards and subsequent generations are recorded on buff, salmon and white cards. This provides for four generations which is about as many as are usually desired, but other colors are available if needed for subsequent generations. Four different blanks in each color are provided known as (1) description cards, (2) culture cards, (3) type cards and (4) blanks which are plain ruled cards used for miscellaneous notes. A description card applicable to beans is shown in Fig. 1. Cards suitable to other plants may, of course, be easily devised. These cards are not often used but are occasionally very convenient. Figure 2 shows a culture card that is used for any crop under observation and gives all necessary information concerning the care, cultivation and growth of any lot of plants.



Crop Bean Hybrids Cross Series of 1910 Generation Crop of 1911
Planted May 17 1911 in 30 in drills in plot 9 growth good
Transp. to no. plts. growth
Culture — hand cultivated and hoed as necessary
Hybridization selfed, using cheese cloth bags.
Harvest Sept. 10 - 20 well matured, moderately productive
Notes
Plants grew slowly till July 1 when hot weather caused rapid growth. Pods setting at that time were short.

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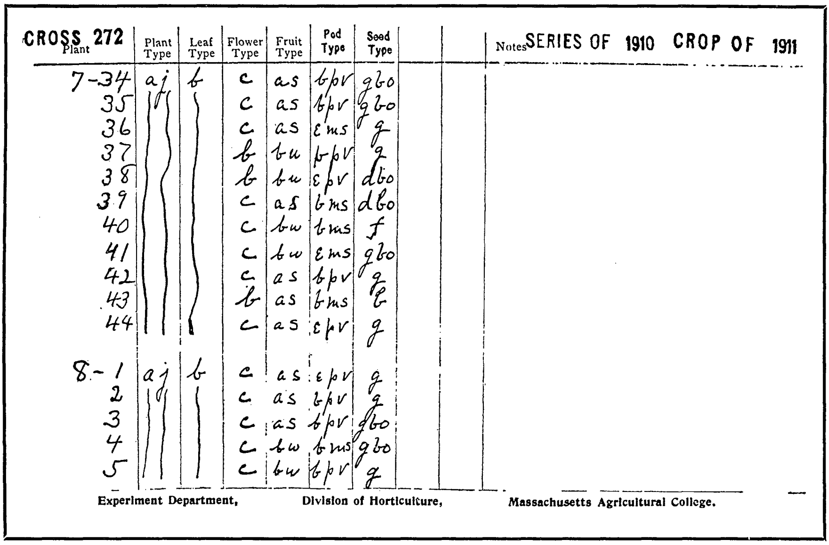
FIG. 2. Culture Card.

The type card shown in Fig. 3 is the most important and distinctive feature of the system. A single line is given to each plant and furnishes opportunity for recording easily and quickly a wide range of observations. Each hybrid between parent varieties is given a serial number that is stamped at the top of the first column and beneath this are entered the numbers of the individual plants. Hybrids between different individuals of a variety are distinguished by the addition of a letter to this number which is discontinued when it appears that the plants are similar in constitution. Numbers given in each generation are carried along separated by a hyphen in the manner usually followed in such work.

Each character that appears is designated by a letter of the alphabet and in order to secure opportunity for recording a large number of characters they are more or less arbitrarily grouped, each group having if needed the whole twenty-six letters available. Each group is assigned a column in the card. In order to illustrate this a portion of the type designations we have used with beans is here given which with Fig. 3 will clearly show the application of the system. The same blank may of course be used with plants other than beans.



CROSS 272 Plant	Plant Type	Leaf Type	Flower Type	Fruit Type	Pod Type	Seed Type			Notes SERIES OF 1910 CROP OF 1911
7-34	aj	b	c	as	bpv	gbo			
35			c	as	bpv	gbo			
36			c	as	ems	g			
37			b	bu	bpv	g			
38			b	bu	epv	dbo			
39			c	as	bms	dbo			
40			c	bw	bms	f			
41			c	bw	ems	gbo			
42			c	as	bpv	g			
43			b	as	bms	b			
44			c	as	epv	g			
8-1	aj	b	c	as	epv	g			
2			c	as	bpv	g			
3			c	as	bpv	gbo			
4			c	bw	bms	gbo			
5			c	bw	bpv	g			

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FIG. 3. Type Card.

Plant type:
a = stems green,
b = stems with purple lines,
c = stems purple tinged,
h = pole form,
i = runner form,
j = bush form.

Flower types:
a = white,
b = light pink,

Fruit types:
a = pod flat,
b = pod oval,
e = pod round,
s = pod straight,
u = pod curved.

Pod types:
a = light green,
b = medium green,
c = dark green,

c = pink.

Leaf types:
a = light green,
b = medium green,
e = medium yellow,
h = broad,
i = medium.

m = no fiber,
p = much fiber,
s = stringless,
v = very stringy.

Seed types:
a = white,
b = buff,
c = yellow,
d = light red,
g = black,
m = medium eye,
o = dark mottling.

The notes shown in Fig. 3 give the following information: The cross in number 272 which is shown by a separate list and by a neighboring guide card to be Prolific Black Wax × Mohawk. This cross was one of those made in 1910 (Series 1910) and these plants were grown in 1911. (Crop of 1911.) The color of the card shows at once the generation. Plant 7–34 had green stems and was a bush bean. The leaf was medium green, the flower pink, the pod flat, straight, green, tough and stringy. The seed was black and buff mottled, the black predominating, as shown by *o* indicating dark mottling. All these observations are very quickly recorded, once they are determined and the record is brief, convenient, definite and easily summarized.

It is of course necessary to record clearly and positively just what is signified by each letter. Most characters appear in some established variety and may be fixed by referring to them. Full description or preserved material may supplement such references when necessary. Additional blank columns are provided to allow for more extended observations or they may be used in connection with the space to the right for brief special notes on the individual plant. If more extended notes regarding any plant or group of plants are desired, a description card or a blank card of the appropriate color may be inserted at any point for their accommodation. Photographs or drawings might also be easily filed if desirable.

We have used these cards for the past three years for recording observations on many thousands of plants, not only beans but several other kinds as well, and the system has given good satisfaction. If it contains any features useful to other observers the purpose of this article will be fulfilled.

J. K. Shaw.

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